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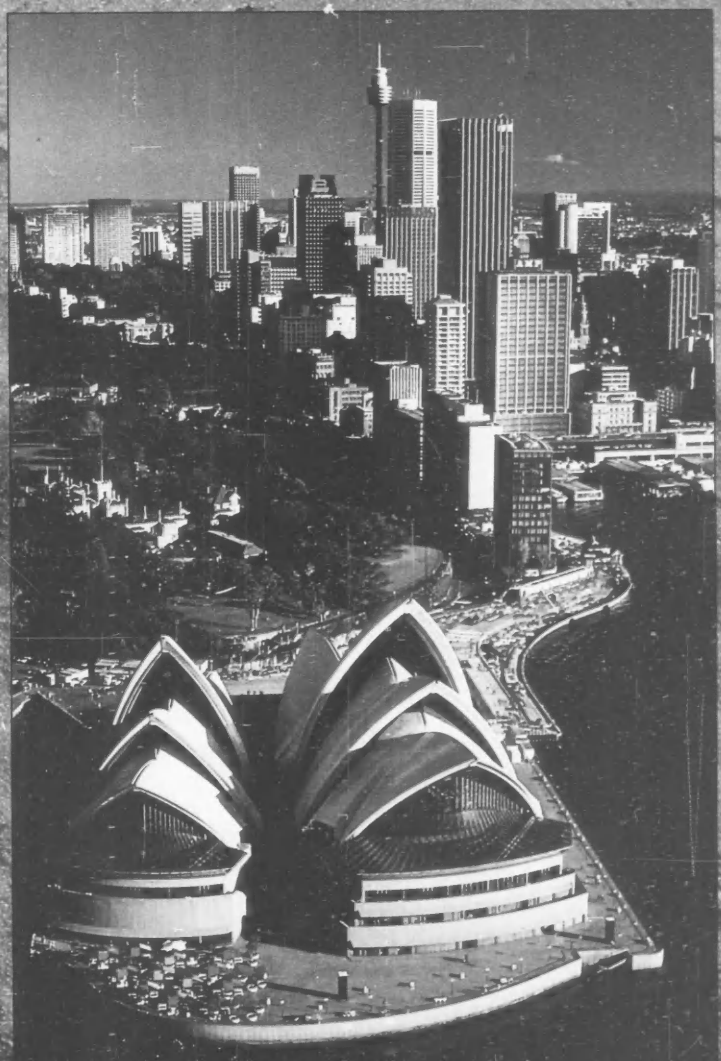
UNKNOWN AUSTRALIA

land of contrasts



THE TIME OF CREATION

The Aborigines of Australia, whose ancestors arrived on the continent some 40,000 years ago, have maintained an unbroken tradition of visual art which evokes myths and legends associated with the "Dreamtime", the beginning of creation. Above, a family of Aboriginal artists at Yuendumu, Northern Territory.

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Cover: Limestone pillars known as the Pinnacles in Nambung National Park, north of Perth. Inset, aerial view of Sydney Harbour with Opera House in foreground.

Back cover: Every patch of colour has a symbolic meaning in this painting by an Aboriginal artist from Papunya, Northern Territory. The concentric circles represent camp-sites (see article page 12).

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41st year

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editorial

On 26 January 1788, a British fleet sailed into Sydney Cove, a small inlet on the east coast of Australia, and established a penal colony.

In the years that followed, what had been a place of exile for some of its first European inhabitants became a land of hope and potential. The discovery of gold in 1851 brought an influx of migrants that has continued ever since. "Living Together", the theme chosen by Australia to mark the bicentennial of European settlement, thus expresses an important aspiration for a country whose people—from the Aborigines whose ancestors arrived some 40,000 years ago to the most recent newcomers—are drawn from many different nations and ethnic groups.

Australia is a vast island-continent, equal in size to the United States without Alaska and Hawaii, and almost twice the combined areas of India and Pakistan. It is a nation of contrasts. Among the most sparsely populated, it is also one of the most urbanized, with most of the population living in cities and towns on the coastal fringes. Much of its development has been dominated by what a leading Australian historian has called "the tyranny of distance"—the distance which isolated the country from the world outside and hampered communications within.

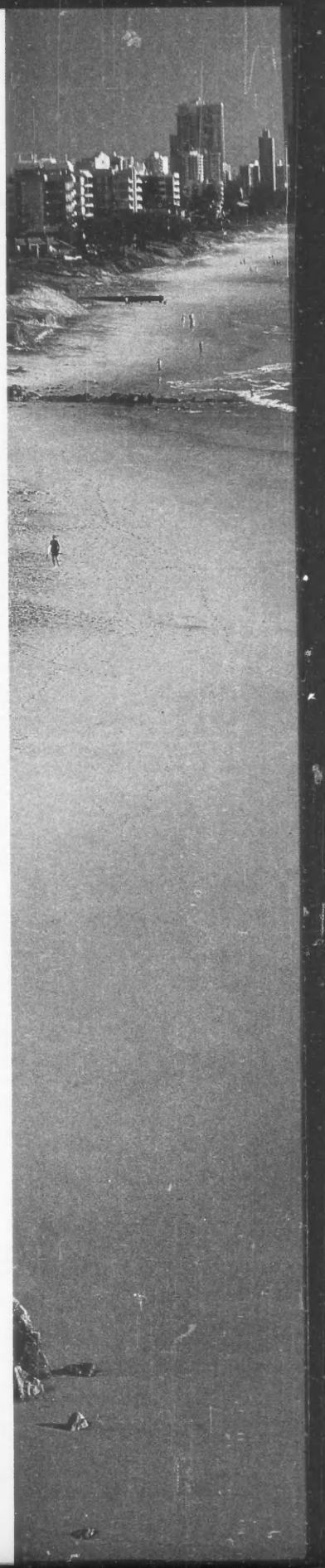
This may help to explain why so many original features of the land, life and culture of Australia have remained so little known and why many achievements by Australians have perhaps not always received the credit due to them internationally. In this issue of the *Unesco Courier*, Australian contributors attempt to redress the balance by presenting some of the lesser-known aspects of their country's history, culture and science.

The Editors of the *Unesco Courier* would like to thank Professor Kenneth Wiltshire of the University of Queensland, Brisbane, for his help in the preparation of this issue.

Who are the Australians?

An Australian historian looks at his country's development in the 200 years since European settlement

BY GEOFFREY BOLTON



AUSTRALIA has always seemed a bit of a paradox in the eyes of the rest of the world. Medieval navigators talked of a Great South Land of gold and monsters. Jonathan Swift situated his imaginary land of Lilliput off Australia's south-west coast. After European settlement began in 1788, reports still spoke of a land where the trees shed their bark but not their leaves, and where Christmas was celebrated in a heatwave. It was the home of the pouched kangaroo, and the furry platypus which laid eggs, and the swagman with corks around the brim of his hat to discourage the ever-present flies. A rich country to be sure, productive of minerals and wool, brave soldiers and impressive sporting personalities, but in the last resort, perhaps, not a nation to be taken quite seriously. Overseas critics, particularly English critics, too often look for traces of colonial immaturity. Australians, they say, are nice enough people but they lack culture and sophistication. They are, in a word, provincial.

Australians are also more aware than most peoples of the shaping influence of the environment. The Aborigines, who inhabited Australia for at least 40,000 years before the coming of white domination, adapted skilfully to their surroundings. They lacked cereals, and remained a hunting and gathering society which did not disrupt the ecological balance. By 1788 there were perhaps 750,000 of them, one for every ten square kilometres of the continent. Captain James Cook, navigating the east coast before claiming the land for Britain, thought them "far more happier than we Europeans ... The Earth and sea of their own accord furnishes them with all things necessary for life". But the white newcomers were not prepared to learn from Aboriginal culture, and the Aborigines succumbed to disease and dispossession.

Various strategic and commercial motives have been suggested for the British settlement of Australia. It was a unique experiment. Australia must be the only significant nation in the world to have been founded as a prison. Between 1788 and 1868 about 160,000 convicts, largely male, were sentenced by British courts to transportation to Australia. English writers commented on the "thief colony" with amused fascination. "They don't thieve all day long, do they?" the essayist Charles Lamb asked a friend who was visiting Sydney in 1817. "It is impossible that vice should not become more intense in such society," shuddered the Reverend Sydney Smith.

The first generation of Australians saw it differently. Some compared New South Wales with ancient Rome, which according to the standard histories of the day was founded by a band of outlaws under Romulus and Remus. Others proclaimed the superiority of the Australian colonies over the United States of America. The first Presbyterian minister, John Dunmore Lang, wrote: "as a penal settlement the history of New South Wales is unquestionably much more interesting to the general reader than that of any other colonies of the Empire. That colony has been the scene of an experiment in the capabilities of man." Australia was a test of the capacity of human material to respond to improved environment and economic opportunity.

High rise apartment blocks overlook the beach at a popular holiday resort in Queensland.

By the 1830s, Australia was becoming one of the world's major wool producers. In 1851 the discovery of gold in New South Wales and Victoria brought half a million immigrants within a few years, so that ex-convicts became an ageing minority among the newcomers and the native-born. There were important regional differences in the pattern of settlement. New South Wales was always regarded as retaining the rough-and-ready politics of its Georgian origins. Victoria, where the gold rushes had the greatest impact, was seen as dominated by Scots investors and respectable but radical Chartists.* Both had a substantial Irish-Catholic element, perhaps 25 per cent of the population, whose Catholicism and strong sense of national identity ensured that Australia could never grow into a second England.

The largely working-class Irish-Australians would always push for a separate Australian identity. Western Australia, on the other hand, always stressed its links with London because its inhabitants thought themselves ignored and disregarded by Melbourne and Sydney. South Australia, never a convict colony, was by far the most Protestant region. Though often a pioneer in social reform (it was the first colony to give the vote to all adults), it was sometimes given

* *Chartists*. Supporters of a British working-class movement for parliamentary reform which took its name from the People's Charter, a bill drafted and published in 1838. *Editor*

to bouts of restrictive morality. Queensland was the frontier where Australian characteristics might be seen at their most exaggerated. Tasmania, left behind in the race for economic growth, consoled itself with rural clannishness.

In each of these colonies the capital city soon grew to contain between one-third and one-half of the whole population. But there was no *Australian* metropolis. The rivalry between Sydney and Melbourne was too intense. This meant that when the colonies eventually federated in 1901 none of the existing cities could be given priority as capital. After much argument it was necessary to create an artificial seat of government between Sydney and Melbourne, at Canberra. Meanwhile, no single Australian city came to dominate Australian culture as London or Paris dominated theirs. In the circumstances it is remarkable that a unified Australian culture came into being as early as the 1880s, the decade in which for the first time a majority of the adult inhabitants were Australian-born.

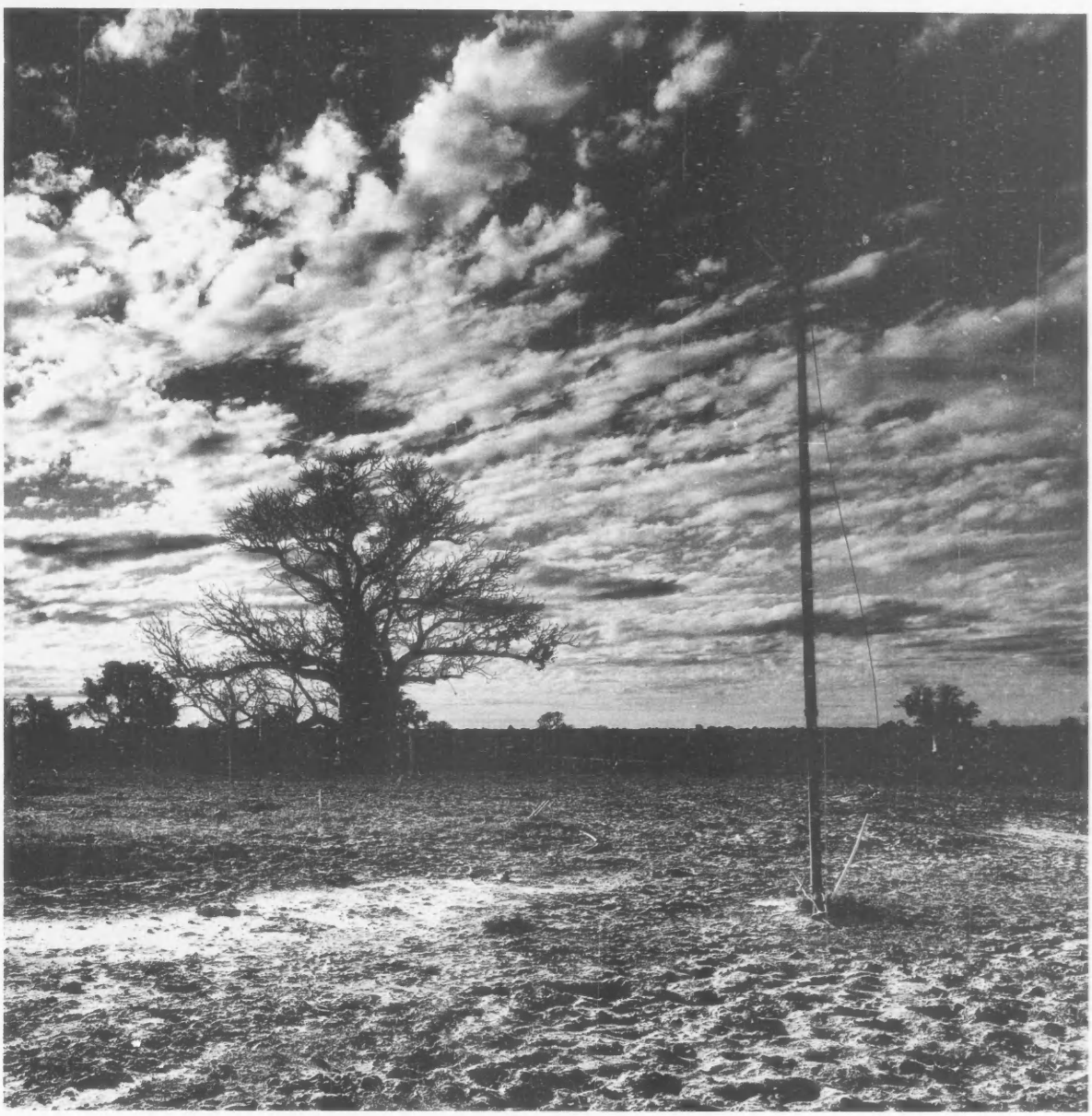
Melbourne gave the new culture its art, Sydney its literature. In Melbourne a group of young painters known as the "Heidelberg School" used the techniques of the French Impressionists to paint Australian landscapes in colours and tones which could be accepted as capturing the authentic look of the country for the first time. For half a century their vision of the comparatively lush vegetation outside Melbourne and Sydney would become the stereotyped image of the Australian bush.

In Sydney the catalyst was a weekly journal founded in 1880, the *Bulletin*. Nationalist and radical in its early years, the *Bulletin* encouraged writers to find their subject-matter in the Australian bush. The cities might be imitations of Manchester or Chicago, but the outback was distinctively Australian. Most of the writers in fact lived within a few kilometres of Sydney Harbour, but they soon won an enthusiastic readership across the length and breadth of Australia. They wrote of the vast sheep stations, of the drovers taking cattle on the hoof hundreds of miles to market, of shearers and miners and the travelling workers who were forming Australia's most significant trade unions.

In their writings the outlines developed of the "typical" Australian man. He was practical, resourceful, good at improvisation but no perfectionist; humorous in adversity, mistrustful of authority, disrespectful towards wealth and property, uncomfortable with women, and staunchly loyal to his mates, though apt to conceal his feelings under a cynical and laconic wit. To the young *Bulletin* journalist Charles Bean, "in the pastoral industry and at the diggings, the ideal of the Australian is still made; or rather the standards of pluck, hardiness, unaffectedness, loyalty, truthfulness, hospitality on which the rest of Australia consciously founds its ideal".

Aboriginal poet Paddy Roe of Broome, Western Australia, is the author of 3 books which preserve the legends of his people.

Here too was a paradox. Even in the early years of the twentieth century, the majority of Australians were already city-dwellers in an increasingly mechanized environment. The *Bulletin*'s authors wrote of a way of life which was receding into nostalgia even as they wrote. But, as the historian Russel Ward argues, the typical Australian was never the same as the average Australian. If Australians saw themselves as a nation of bushmen they were entitled to their national myth, just as modern urban Americans may identify with the frontier virtues of the Old West. But the Australian national myth received powerful reinforcement during the 1914-1918 war. Australia sent a high proportion of its younger men to fight in the British Empire's cause. Of these, one in six was killed and about two-thirds became casualties. But it was the landing at Gallipoli (Turkey) on 25 April 1915 which crystal-



Sand, sky and silhouettes near Derby in Western Australia

lized many of the concepts of Australian nationalism.

The Gallipoli campaign was part of an ill-starred plan to knock Turkey out of the war. Allied troops, including a large proportion of Australians and New Zealanders (the Anzac corps) managed to establish themselves on the beach at Gallipoli but failed to dislodge the Turks from the heights behind. There the two armies slogged it out for eight months until in December 1915 the invaders withdrew. Gallipoli established the reputation of the Anzacs as heroic fighters. The defeat could be blamed on the incompetence of British planning, whereas the heroism was proof that the recently federated Commonwealth of Australia was capable of taking its place among the nations of the world by the usual rituals of bloodshed.

The *Bulletin* writer Bean covered the campaign and later became Australia's official war historian. He argued persuasively that the special qualities of the Australian soldier were those of the bushman: the same resourcefulness, stoicism, wry humour and loyalty to his mates. So the image of the typical Australian won acceptance at home and overseas. Despite the continuing sprawl of Sydney, Melbourne and the lesser cities, the Australian virtues were those of the wide outback.

Australians on the whole were happy with this self-image, but English visitors sometimes worried about whether it concealed a lack of depth. D.H. Lawrence, spent three months in Australia in 1922, complaining at one moment that Australians were "healthy, and to my thinking almost imbecile", but also noting that "nobody felt *better* than anybody else, or higher; only better-off".

In 1935 the expatriate professor of English

at the University of Melbourne, G.H. Cowling, stirred up controversy by claiming that Australia could never hope to produce an adequate literature. "There are no ancient churches, castles, ruins—the memorials of generations departed ... From a literary point of view Australia lacks the richness of age and tradition." He was indignantly refuted by Australian patriots, but the fact remained that for most of the first half of the twentieth century a steady procession of Australian writers—Henry Handel Richardson, Martin Boyd, for a while Patrick White—went to live in Europe. They were willing to pay the price of exile for intellectual stimulus.

The 1939-1945 war brought profound changes. When Japan entered the war and Singapore fell, Australians realized that they could no longer count on British protection. In the future they must increasingly seek trade and alliance with foreign powers; first the United States then, when the war was over, the nations of East and South-east Asia, including before long Japan as a major trading partner. The war also convinced most Australians that their country was underpopulated. No longer proud of origins which were 97 per cent British, the Australians after 1945 opened their country to an unprecedented inflow of migration. In thirty years the population doubled, passing 15 million by 1980. Until 1970 nearly all the newcomers were of European origin: Italians were most numerous, but Greeks, Yugoslavs, Germans, Dutch, and eastern Europeans were also well represented.

The "White Australia" policy was quietly discarded during these years, and from the 1960s a modest amount of Asian immigration occurred, growing after 1975 because of an influx of Vietnamese refugees. Migrant demand created prosperity for many Australian industries, as did overseas demand for Australian wool and minerals. Urbanization grew; by the 1970s Sydney and Melbourne were supporting populations of nearly three million, with Adelaide, Brisbane and Perth each having nearly one million. Air travel and television swept Australia from its isolation. Times of such rapid change presented a challenge to conventional images of what it meant to be Australian.

Under Sir Robert Menzies (prime minister 1949-1966) belief in the British connection was still officially fostered, although American culture and American foreign policy were gaining in influence. Between 1965 and 1971 Australia sent troops to help the Americans in Vietnam. But in the late 1960s the forces of protest and change found a voice, and in 1972 a Labor government

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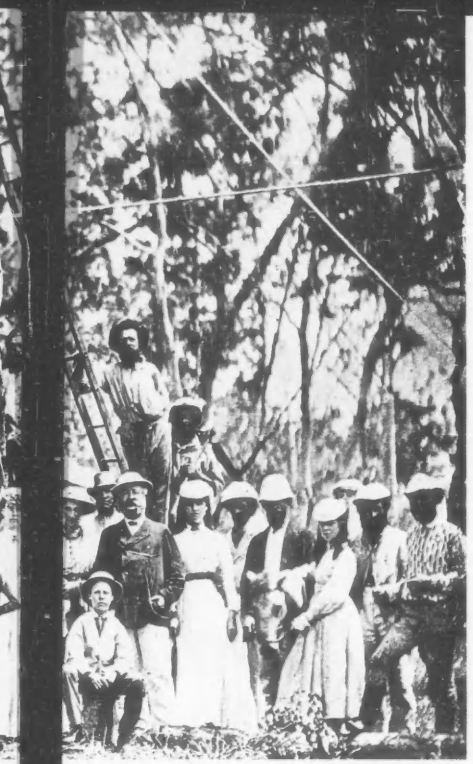
Steps to nationhood



Begun in 1870 and completed in 1872, the overland telegraph line between Adelaide and Darwin accelerated communications within the continent. Left, a ceremony held at the planting of the first telegraph pole near Darwin.

Below, the ruins of the 19th-century penal settlement at Port Arthur, Tasmania

Bottom left, Hill End, a town in the New South Wales goldfield, as it was in 1872.

Bottom right, a miner of gold rush days panning for the precious metal.

AUSTRALIA'S first settlers were the Aboriginals, hunters and food gatherers who are believed to have migrated from Asia 40,000 years ago. They lived undisturbed for many centuries, during which the only other visitors to Australia may have been Indonesian traders who sailed to the continent's north-west coast. Australia however remained a mystery to the rest of the world until less than 400 years ago.

Although a "Terra Australis"—a Great South Land—was shown on maps as early as the second century AD, its actual existence was not confirmed until the 17th century as a result of Portuguese, Spanish and Dutch mercantile expansion into Asia.

The first Englishman to visit the continent was the buccaneer William Dampier, who landed on the north-west coast of what is now the State of Western Australia in 1688. In 1770 Captain James Cook of the British Navy sighted the east of the continent, charted it, and after travelling up the coast landed at Botany Bay.

The first European settlement of the continent occurred on 26 January 1788, when Captain Arthur Phillip landed at Sydney Cove (now Port Jackson) near Botany Bay and established a penal settlement. He took possession of the whole of the eastern part of the continent which he named New South Wales.

The first white settlers were convicts and their soldier guards and some tradesmen sent to help establish the new penal colony. Although at first struggling in a harsh, alien land and dependent on supplies from Britain, the colony began to reach inland from what is now Sydney. The hinterland was explored, farms were developed, and eventually the colony became self-sufficient in most foods.

Extensive exploration in the 19th century led to vast areas being opened for development and the establishment of new colonies which subsequently became the States of Victoria, Queensland, South Australia, Western Australia and Tasmania, and the Northern Territory.

Transportation of convicts from Britain to New South Wales ended in 1840 and to Tasmania in 1853, but the population growth was spurred by the arrival of free settlers attracted by the prospects of riches on the New South Wales and Victoria goldfields and the opportunities to take up tracts of land for farming. Agrarian development burgeoned and the mainstays of the economy became wool, meat, wheat and gold.

While the alluvial gold mining industry declined towards the turn of the century, rural industries continued to expand and are still important in Australia's economy.

The growth of the population and of the economy led to calls by each of the colonies for self-government and for their own legislatures, which were granted by Britain. Progress towards federation was inevitable and in 1901 the six colonies joined in a federation of States to become the Commonwealth of Australia.

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came to office under Gough Whitlam, standard-bearer of a new concept of Australian nationalism.

Nationalism under Whitlam was multicultural. Instead of stressing the continuities with British institutions, Australia would identify itself with the cultural traditions of all its numerous migrant groups. At the same time care would be taken to preserve the architectural and cultural heritage of the pioneering past. The Australia Council was founded to steer government funding to the creative arts. Whitlam's government lasted only three years. Trying to push through too many reforms at once, it ran into a world economic crisis and was controversially dismissed by the governor-general in November 1975. At the elections the conservative parties were swept back into power. But during the Whitlam years the agenda was set for future debate about Australian nationalism and Australian national self-concept.

Meanwhile, sport was always a means of vindicating Australian prowess. In earlier years Australian cricket teams had successfully competed with England for the legendary Ashes.** During the 1950s Australia beat the United States and the rest of the world at tennis. And in 1983 Australia declared a national day of rejoicing when for the first time in over a century the Americans lost the international yachting trophy, the America's Cup, to an Australian competitor financed by the immigrant millionaire Alan Bond. The 16 million Australians liked to see an element of David-and-Goliath when their athletes won victories over rivals from countries with much larger populations. Sport for the Australians has often been a benign and realistic way of fostering national pride without lapsing into militarism.

** *Ashes.* Symbol of victory in cricket match series between national teams of England and Australia. The term was first used after Australia defeated England in London in 1882 and an English newspaper lamented that English cricket was dead and that its body would be cremated and the ashes sent to Australia. *Editor.*

Outsiders observing the Australian enthusiasm for sport have sometimes concluded that Australians are a race of mindless hedonists without cultural interests. They concede that Australia has produced an impressive number of creative individuals—writers such as Christina Stead and Patrick White, artists such as Sidney Nolan and Arthur Boyd, interpreters of classical music such as Charles Mackerras, Joan Sutherland and Barry Tuckwell—but claim that Australia itself is still a cultural desert. Such a picture is long out of date. The major Australian cities have more to offer in the way of music and the visual arts than many European centres of the same size.

There is no dominant metropolis in which all cultural activity is concentrated. When Australia's population was smaller this led to diffusion of effort, but in recent years strong

With an estimated 500,000 registered players, cricket is Australia's most popular summer game. International matches, right, sometimes attract crowds of 80,000.

local traditions in the creative arts have begun to emerge. Australian theatre is perhaps less vigorous than it was fifteen or twenty years ago, but in compensation there has been an impressive record of film production. Australia has a long association with cinema and may even have produced the world's first feature-length film around the turn of the century, but the industry was largely eclipsed by Hollywood in the 1920s and it required imaginative government support during the late 1960s and early 1970s to launch a revival. The results have gained international recognition. (See article page 35).

Australians in quest of a national identity have recently developed a consuming curiosity about their background. Family history has become a hobby straining the resources of public libraries. Museums and heritage parks are big business, encouraged in almost every small town because of their tourist potential. Television series based on Australian history enjoy a wide audience. Colonial furniture and antiques are prized by those who can afford them. The colonial idiom is fashionable architecture. Australian historians stress the need to write "history from below"; the history of everyday life including the underprivileged, history with which today's Australians can identify, including Aborigines and immigrants.

But here controversy reigns. Is there a mainstream Anglo-Australian culture with which immigrants and Aborigines should be expected to identify? Or is Australia's cultural identity still in a state of flux? Should encouragement be given to a multicultural pluralism in which Aborigines and immigrants of Asian and European origin are encouraged to affirm their ancestral traditions? Official policy in recent years has favoured multiculturalism, but this has given rise to a backlash from critics who fear that such a trend will be socially divisive. They claim that the affirmation of ancestral traditions may mean the retention of ancestral grievances, leading to ethnic strife and even to a form of apartheid. This is an especially acute issue with Aborigines, many of whom in recent years have rejected the idea of assimilation within mainstream society and are claiming the recognition of their separate identity based on their unacknowledged land rights.

It is impossible that Australia should remain the "new Britannia" envisaged by its founders 200 years ago, or even the old Australia of outback tradition. Starting with the Aborigines, the Australian people have become a mixture of British, Irish, European, and Asian origins living in an environment different from any other. Within the last 200 years, and especially in the last fifty, they have begun to create a new culture with enormous potential for combining European background with awareness of Asian neighbours. It is impossible that a people exposed to such a range of experience could remain the rough-and-ready stereotype of popular myth. Perhaps the last word should go to David Martin, himself a Hungarian migrant turned Australian, who has written: "Foreigners easily—too easily—assume that Australia is a crude habitat. They do not understand that, on the contrary, it is a subtle one, home of a subtle people." ■

Experiments in breeding fine-wool Spanish Merino sheep began in the late 18th century and laid the foundations of Australia's future economic development. Above, giant Merino statue at Goulburn, New South Wales.

Schoolchildren visiting the Melbourne Zoo measure their height in relation to a wooden kangaroo.

GEOFFREY BOLTON, one of Australia's leading historians, has been Professor of History at Murdoch University, Perth, since 1973 and was Director of the Australian Studies Centre in London from 1982 to 1985. He is the author of a number of books on Australian history including *Spoils and Spoilers: Australians make their Environment, 1788-1980* (1985) and was the General Editor of the *Oxford History of Australia*.

Dreamtime stories

The living testimony of Aboriginal art

BY VERONICA TIPPETT

THE Aboriginal art of Australia belongs to the world's oldest living art tradition, unbroken for thousands of years. It continues to survive and develop because it has been retained and treasured in the memories of successive generations of Aboriginal people who have invested it with remarkable breadth, depth, symbolism, vigour and intensity.

Despite the fact that the past 200 years of European settlement have seen the erosion of much of the traditional fabric of Aboriginal life and the cultural attenuation of many groups of people, a large and rich body of Aboriginal artistic heritage has survived. In many communities the arts are still an integral part of social and religious life but have also acquired a new and urgent emphasis—that of reinforcing Aboriginal identity and asserting traditional values in the face of an encroaching wider community.

In many ways the extraordinary richness and variety of Aboriginal culture, even in Australia, has been a well kept secret. But while there is still emphasis on secrecy to preserve the sacred nature of much Aboriginal culture, there is also an increasing openness and willingness to share aspects of it. For example, it is still not widely known that Australia is the world's largest repository of Palaeolithic rock art sites, many of which predate the well-known rock art galleries of Europe and Africa. Throughout Australia there are thousands of sites housing superb engravings and paintings. In northern Australia in particular there are vast galleries which record a pageant of mythological and historical events from Antiquity until recent times. As individual works of art they are astonishing and as a continuous record of the development of a unique artistic tradition they are unsurpassed.

Most traditional Aboriginal art can be regarded as religious art, in which landscape and myth predominated. As such, it represented and amplified themes concerning the sacred myths and totemic beliefs connected with the Dreamtime, that sacred time in Aboriginal culture which represents the beginning of creation. According to Aboriginal belief, all life as it is known today—human, animal, bird, fish—is a part of one unchanging and interconnected system, one vast network of relationships, which can be traced back to the Great Spirit ancestors of the Dreamtime. The Dreamtime refers not only to an ancient era of creation—it continues as the Dreaming in the spiritual lives of Aboriginal people today.

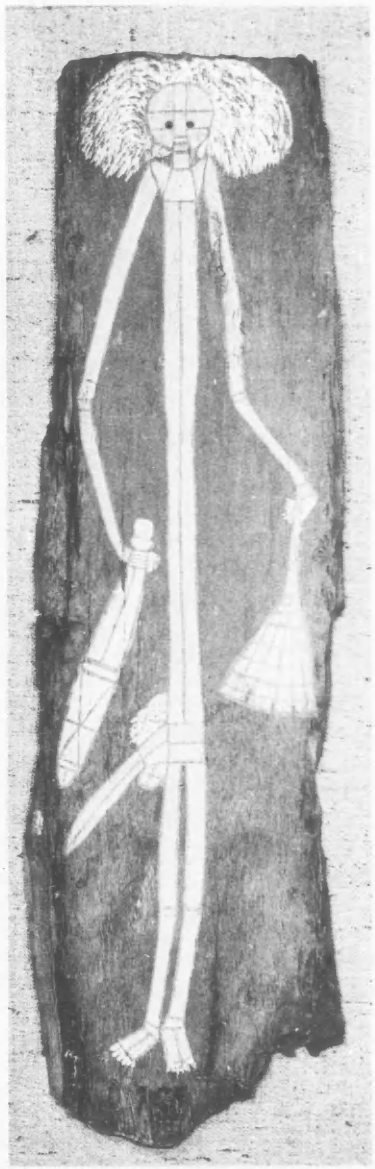
Often Aboriginal art was, and is, also a statement concerning land—a reflection of the Aboriginal relationship to particular stretches of land to which individuals or groups were linked through mythological associations or specific connections with spirit beings. Art, as the essence of the mythical and ritual force, pervaded the life of Aboriginal society, uniting it and giving it meaning.

Music, song, dance and the associated visual arts were all inextricably connected. There were no "professional" artists as such in Aboriginal society. *Everyone* participated in the arts, although those with exceptional skills were recognized and encouraged.

Aboriginal Australia was (and still is) made up of small, select groups with different languages and distinct territories. This gave birth to different art styles and traditions. Western Desert art, for example, with its curves, lines and concentric circles, has a unique and very distinctive style. Papunya, an Aboriginal community settlement about 300 kilometres west of Alice Springs, is the present home of several tribal groups whose original home territories lie in central Australia. There, the Walbiri-Pintubi people create magnificent ground designs from plants, feather-down, ochre and clay. These patterns represent the land as well as events of the

Left, Aboriginal painter Lindsay Roughsey at work on a bark painting entitled *Moon Legend Story* on Mornington Island off the northern coast of Australia.

Bark painting of a *Mimi* or rock-spirit



creation era. The meanings of the symbols in the ground paintings vary according to the site revealed, the religious inferences and the degree of information the artists have been allowed to convey. The paintings also tell stories through symbols and signs which continue to be part of traditional Aboriginal communication.

Papunya is also the birthplace and home of a dramatic and profound new art form which has caught the imagination and interest of people throughout Australia and overseas. It involves the transference of the decorative ground sculptures and sand paintings onto board and canvas with the use of commercial paints. This innovation in Western Desert art began in 1970 with the encouragement of a teacher at the settlement. Now the Desert painters produce an exciting and vivid array of paintings in which traditional themes are considerably elaborated and colour contrasts are used which were not possible using traditional techniques. But the distinctive Desert style remains; the symbols and stories retain their links with a tradition that stretches back to the Dreamtime. Neither does this new form displace the old—the ground paintings are as important as ever in their original ritual context.

In the north of the Northern Territory, other, just as distinctive, art styles are to be found. The rock and bark paintings of western Arnhem Land are an outstanding example. The Aboriginal people in this large tropical region have retained close links with their long past and with the land they have inhabited for many thousands of years. Much of the rock art that abounds in this area reflects that antiquity and underscores Aboriginal links with earliest times. Some of the oldest paintings are said to have been produced by spirit beings called Mimi. They are vivid, lively, open line drawings, usually in red ochre, of men and women in action—running, fighting and hunting.

Despite European intrusions, reli-

gious and ceremonial life and artistic activity have continued to exist and develop in this part of the country. Many bark paintings being produced today by Arnhem Land artists reflect a remarkable continuity of subject and style with the ancient cave paintings. One feature of rock art that appears in contemporary paintings is the X-ray drawing style that illustrates the internal organs and skeletal structure of the creatures represented. These paintings, which generally portray animals, birds, reptiles and fish—seldom human beings—are intended to reveal the *whole* being, not simply its external manifestation. Yet this adherence to traditional technique and style is no mere copyist tradition, but an art that is vibrant, relevant, imaginative and contemporary.

The art of bark painting has flourished over the last two decades to become the most widespread form of Aboriginal artistic expression throughout northern Australia. Designs are painted in earth ochres on the smooth inner surface of sheets of bark from stringybark eucalyptus trees. The bark is stripped from the trees during the wet season and cured over a fire. The edges are then trimmed, and the bark is flattened with stones or weights. Colours come from a range of earth-based pigments including ochres, pipeclay and manganese, as well as charcoal, giving the artists a palette of white, brown, yellow, red and black. No blue or green paint is used, but the addition of seeds, feathers and leaves makes possible a wide choice of patterns and colours.

All Aboriginal art traditionally rested on the need for explanation, and today when an artist sells his work, he usually provides a brief "story" for each piece. Generally this is the simplest explanation of the design, such as might be given to an uninitiated child. The deeper levels of meaning, the references to sacred symbols and other details reserved for tribal elders who have attained ritual maturity, are never passed on at the sale of the painting.

In many families of eastern Arnhem Land today, unlike in earlier times, the women often paint on bark. Their designs represent aspects of life related to their traditional role of food gatherer.

As the story of the Papunya artists shows, non-traditional art forms such as acrylic paintings, batik, silkscreen printing, leatherwork and pottery are also being adopted and developed by Aboriginal artists and have no less validity or legitimacy as cultural expressions. Such innovative responses to a changing world include the beautiful batiks of the women of Utopia whose works incorporate motifs and designs derived from traditional stories and their desert environment.

The Tiwi people of Melville and Bathurst Islands about 100 kilometres north of Darwin have also successfully blended the old and the new to produce a dynamic and creative art industry. The Tiwi people have lived on these two islands for more than 20,000 years, expressing their culture in art and craftwork that is now sought worldwide.

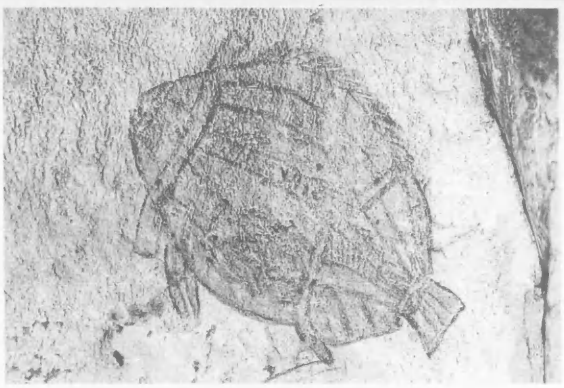
Tiwi art is traditionally strongly abstract and symbolic, comprising circles, curved lines and dots. These designs are

Bark drawing from the Alligator River region, Northern Territory. Depiction of internal as well as external organs of man and emu is characteristic of Aboriginal art from this region.

applied to a number of artefacts, the most dramatic being the spectacular *pukamani* or grave posts which are unique to the Tiwi. In 1969 an art teacher at the mission school on Bathurst Island began an Aboriginal silkscreen workshop. This led to the founding of two ventures, Bima Wear and Tiwi Designs. Bima Wear recently fashioned the Pope's vestments for his visit to Australia. Today all seventeen people who work at Bima Wear are Aboriginal women. Most of the garments designed, printed and sewn by them are for females. Tiwi Designs, on the other hand, employs only men. Women have worked there in the past, but traditional cultural influences make it difficult for men and women to work together. Tiwi designs, which have strong visual appeal and have become very popular, are now applied to a wide range of items from tablecloths, placemats, T-shirts and wall hangings to lengths of fabric for fashions and furnishings. Although this enterprise is recognized by the Aboriginal artists as a "new way", they point out that it is based on a traditional understanding of their natural environment and a familiarity with ritual knowledge and its traditional forms of expression.

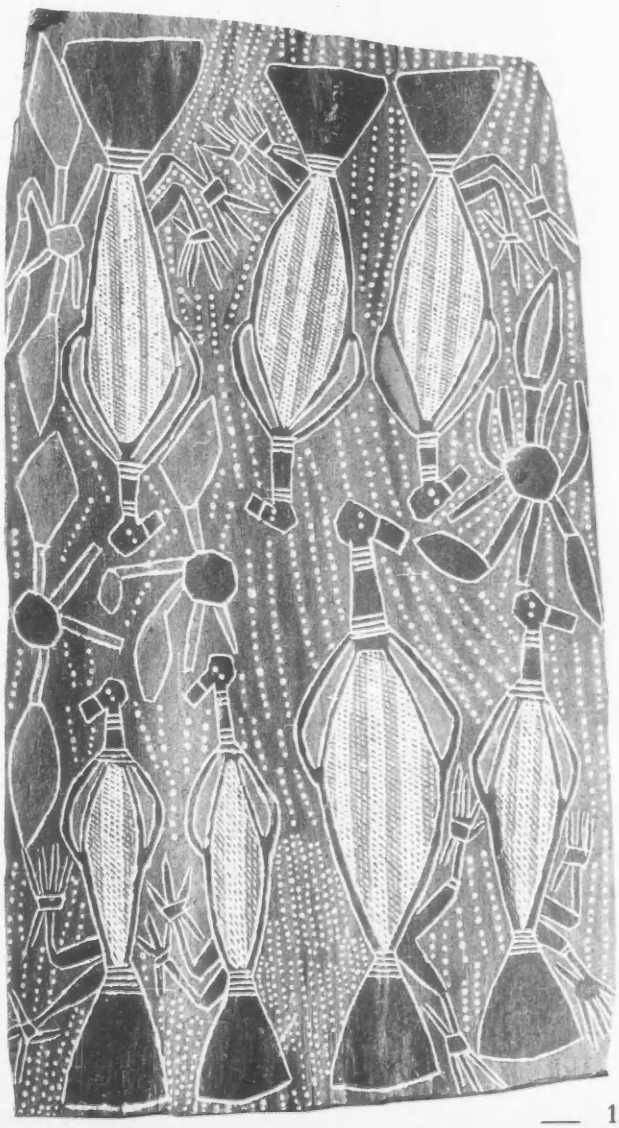
Today, all major art institutions in Australia and many regional galleries are building collections of Aboriginal art. And through public exhibitions, media reviews, films and publications, the work of senior Aboriginal artists is being increasingly seen as one of the most important and vibrant facets of Australian cultural life. ■

VERONICA TIPPETT is the Aboriginal Programs Officer in Australia's Department of Foreign Affairs and Trade and is herself an Aboriginal. She has held a number of senior positions in the Australian national public service and has been particularly concerned with equal employment opportunity and training programmes.



This depiction of a fish was incised on a cave wall in Arnhem Land, in Australia's Northern Territory, some 5,000 years ago.

An aboriginal healer has portrayed a gaggle of man-like geese in this bark painting from the swamp country near Elcho Island, Arnhem Land.



The natural legacy

BY RALPH SLATYER

AUSTRALIA is the only country to occupy a whole continent. Mainland Australia together with the island State of Tasmania occupies some 7.7 million square kilometres, making the country the sixth largest in the world, after the Soviet Union, Canada, the People's Republic of China, the United States of America and Brazil, and very similar in size to the forty-eight contiguous States of the United States. Australia also has one of the longest coastlines of any country.

The Australian continent once formed part of the super-continent Gondwanaland. Although separation of individual continents from this southern land mass commenced about 130 million years ago, the Australian continent and the islands of the region separated more recently. Bass Strait and the Tasman Sea appeared 80 million years ago, resulting in the separation of Tasmania, New Zealand and Lord Howe Island.

After separation of Australia from Antarctica some 20 million years later, the Australian tectonic plate drifted north and is thought to have reached a location close to its present position

about 15 million years ago. At that time it came into contact with the Sunda Island arc system, forming the present New Guinea land mass. Further northerly movement of the Australian plate resulted in a disjunction which saw permanent separation of the Australian and New Guinea regions. Much of the topographic and geographic character of these regions was laid down during this period.

The continent has experienced major changes in climate both during the period of rapid continental drift and while it has been near its present location. At the same time it has been relatively free of the major tectonic disturbances which have led to extensive mountain building in most other continents. In the process, it has developed the distinctive land surface and unique flora and fauna which characterize its present environment.

The uniqueness of Australian flora and fauna is due in part to their isolation from the biota of other land masses. This genetic isolation has resulted in divergence among some plant and animal families and genera, leading to a considerable diversity of species. The rich and varied marsupial fauna and the array of flowering plants in families such as the Proteaceae, and in some genera in other families, such as Eucalyptus and Acacia, are some examples of this diversity.

Given these unique flora and fauna and the presence of striking land forms, Australia is endowed with a magnificent natural heritage which is now being recognized by the inclusion of some of the most outstanding sites on Unesco's World Heritage List.

Already, Australia has seven properties inscribed on the List – Kakadu National Park, the Great Barrier Reef, Willandra Lakes Region, Western Tasmania Wilderness National Parks, the Lord Howe Island Group, Australian East Coast temperate and subtropical Rainforest Parks and Uluru National Park.

In view of Australia's large size, it is often a surprise to realize that its human population is only 16 million. A major reason for this is that most of Australia lies between 15° to 35°, the zone where most of the world's great deserts are found. More than 80 per cent of the continent lies in arid or semi-arid climatic zones. Indeed, Australia is by far the driest continent, regardless of whether the comparison is in terms of precipitation or, more particularly, surface water resources. Irrigated agriculture is limited in extent and rainfed agriculture is largely restricted to the eastern, south-eastern and south-western parts of the continent.

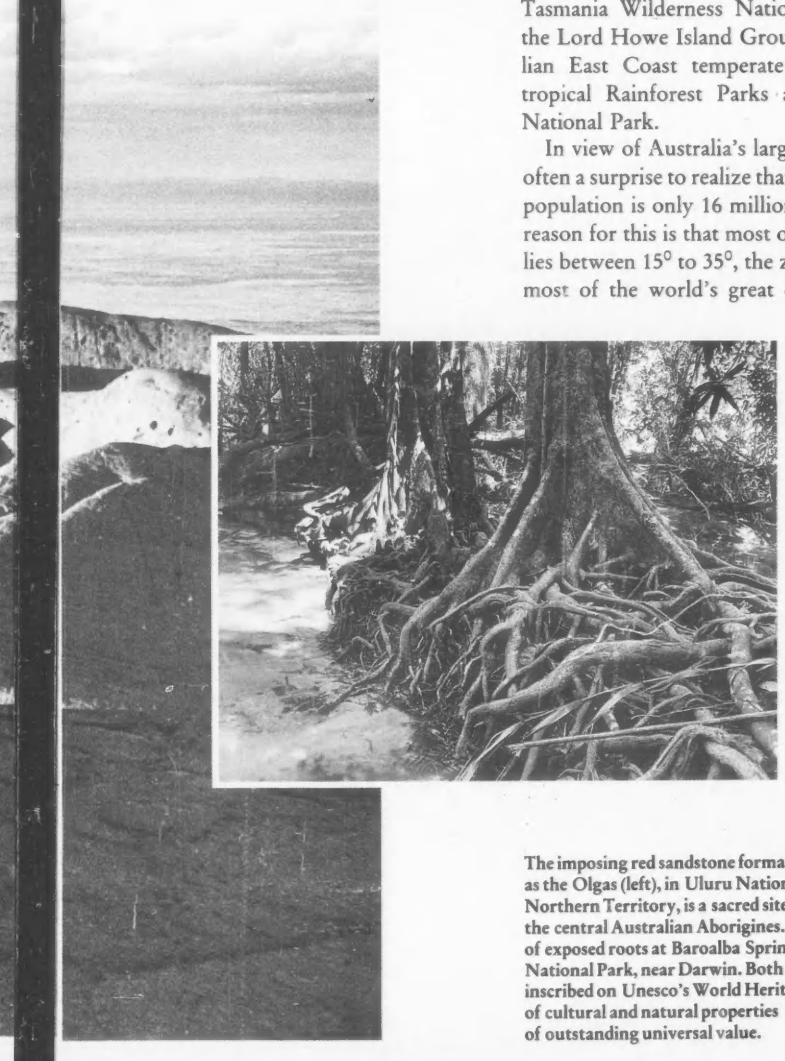
The limitations imposed by the physical environment need to be recognized if sustained and stable land use is to be achieved.

This posed relatively few problems for the Aboriginal people whose culture is ecologically sympathetic. In their culture, people constitute an integral and interdependent part of the ecosystems they occupy, responding to the characteristics and fluctuations of the environment in a way that maintains the land and its flora and fauna in ecological balance.

By comparison, European occupancy of the continent, the cultivation of the land and the modification of the flora and fauna have had a dramatic impact on that balance. Although Australia has experienced only 200 years of European occupation, and although the human population has been low, land degradation has already emerged as the greatest environmental problem in Australia.

Land degradation has proceeded quickly not just because of the low and variable precipitation which characterizes much of the continent. It has been compounded by the old and deeply weathered land forms, and underlying geology, which have produced shallow soils with poor structure and intrinsically low fertility. It is not surprising that such soils have become degraded when exposed to an erosive climate. Land degradation has also been compounded by the deliberate and accidental introduction, since European settlement, of a number of plant and animal species, and micro-organisms, which have become weeds, pests and diseases.

European settlement opened up ecosystems to the entry of exotic species which were often able to compete successfully with native species for available ecological niches. For example, the feral rabbit became established relatively easily, owing to the lack of mammalian predators in the Australian biota, to



The imposing red sandstone formation known as the Olgas (left), in Uluru National Park, Northern Territory, is a sacred site to the central Australian Aborigines. Inset, tangle of exposed roots at Baroalba Springs, Kakadu National Park, near Darwin. Both Parks are inscribed on Unesco's World Heritage List of cultural and natural properties of outstanding universal value.

changes in the habitat, and to early extinction of species which occupied similar ecological niches.

With the wisdom of hindsight and with more enlightened management, many of these problems could have been avoided or minimized. However, given the lack of knowledge about the management of such soils in such climates, when agricultural and pastoral activities first began in Australia in the late eighteenth century, it was inevitable that the impact would be severe.

Fortunately, there now appears to be a rapidly growing awareness of the magnitude of the problem and of the need to modify land use practices to minimize further degradation and, hopefully, to reverse the downward trend.

In this regard, Australia is well placed in having a number of internationally respected research institutions devoted to various aspects of land use. Until fairly recently the research emphasis in these institutions was focused on the development of the rural industries. Indeed, because of the need to develop new crops, technologies and farming practices, agriculture could not have become a major industry in Australia without a strong science base.

Scientists working in these research institutions, mainly in universities and Federal and State departments and authorities, have skills ranging broadly across the biological and physical sciences. As awareness of the importance of maintaining long-term productivity grows, these skills have a key role to play in research and development related to land degradation.

Many of the environmental problems in Australia have their parallels in other parts of the world, particularly in countries which occupy similar latitudinal zones. Many of these are developing countries which lack the expertise and resources necessary to ensure good environmental management and minimize land degradation. As a result Australia and Australians have been active in many bilateral and international programmes which are focused on the environment. ■

RALPH SLATYER is Director of the Research School of Biological Sciences at the Australian National University in Canberra. He has been closely involved in several international environmental programmes, notably Unesco's Man and the Biosphere programme of which he was Chairman from 1977 to 1981. Professor Slatyer was Australia's Ambassador to Unesco from 1978 to 1981 and was Chairman of the World Heritage Committee from 1981 to 1983.

COLOUR PAGES

Colour page right

Above, a landscape of red soil and drought-resistant grass in the Musgrave Ranges, in the north-west of South Australia.

Below, mustering sheep in a station near Goulburn, New South Wales.

Central colour page

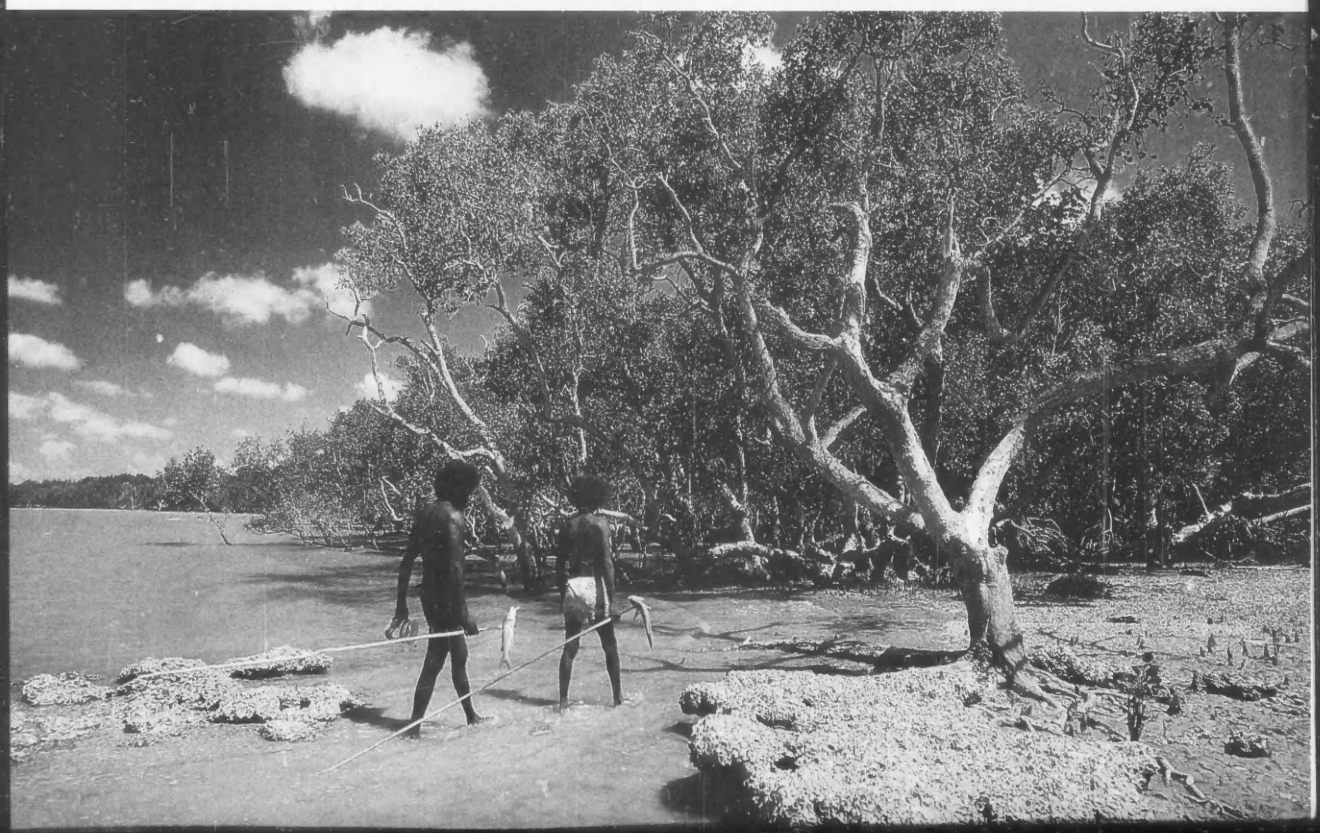
On the transcontinental railway, a train hauls supplies through the Nullarbor Plain in Western Australia.

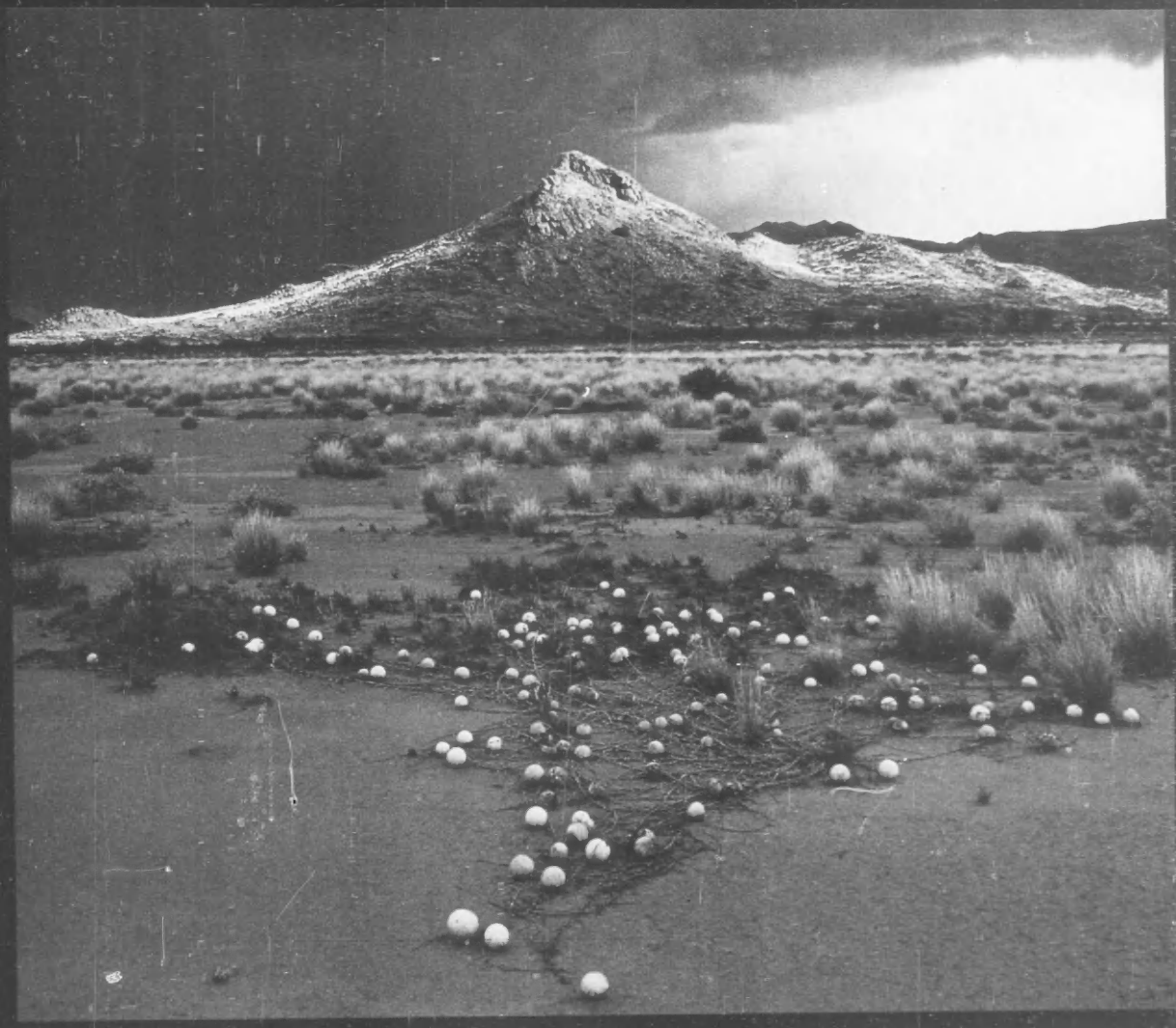
Colour page 22

Above, *The Old Oak Fallen* (1977) by Sidney Nolan (b. 1917). The landscape of the outback has been a fertile source of inspiration to Australian artists.

Below, eucalyptus under snow near the ski resort of Perisher Valley on the slopes of Australia's highest peak, Mt. Kosciusko, New South Wales

Aborigines fishing in Arnhem Land, Northern Territory





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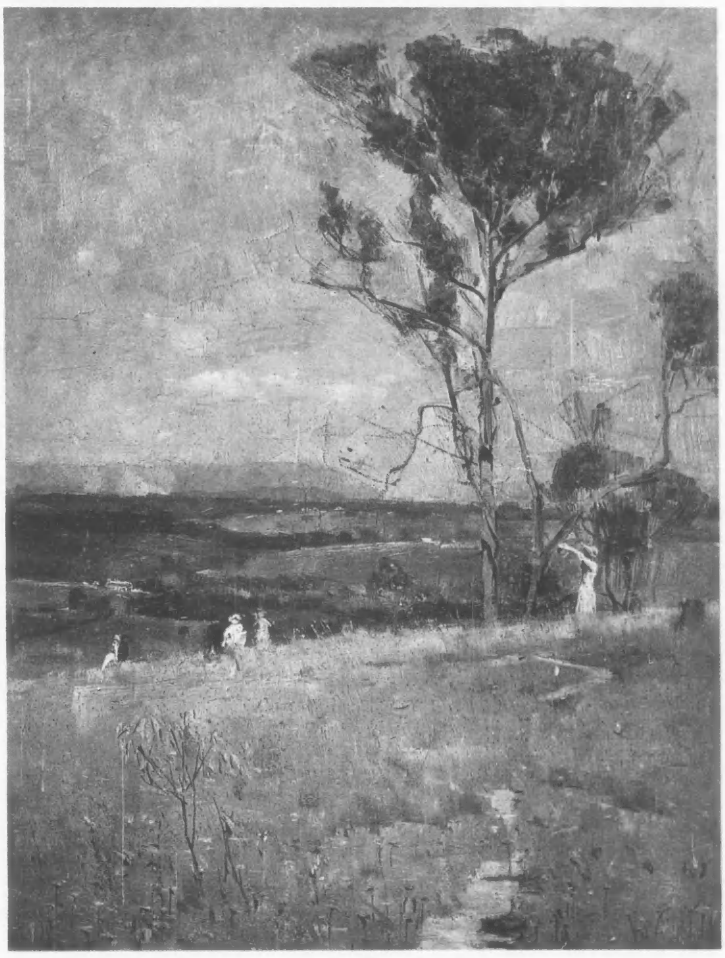
TRACKS

The unknown art of Australia

BY BERNARD SMITH



Near Heidelberg (1890), oil on canvas by Sir Arthur Streeton (1867-1943). A leading member of the "Heidelberg School" of artists, named after the Melbourne suburb where they often worked, he is best known for his luminous, panoramic landscapes of Victoria and New South Wales.

LIKE the first Australian art created by the Aboriginal people, the highly distinctive art that has developed in Australia since European settlement in 1788 is rarely mentioned in general histories of art. Why is this so?

There are two important reasons. First, most general histories of art are written by European or North American historians. Most of them are convinced that art produced outside of Europe and North America is either folk art or a second-rate imitation of European art. In either case it can safely be ignored.

The second reason why Australian art is not known abroad is related to the first. The art establishment in Australia is well aware of the Eurocentric values that dominate the world of *high* art, and when preparing collections of Australian art for exhibition abroad it always sets out to show that Australian art is just as up-to-date as that from anywhere else in its knowledge of the latest European fashion. Australians call this approach "the cultural cringe".

Of course good art possesses both a regional and a universal quality: regional in that it evokes the spirit of a place, a time and a people; universal in its appeal to all humankind, and in its links and associations with other cultures and other times. To recognize this basic but paradoxical fact was the greatest achievement of modernism.

Australian art has become, during the past century, a highly important theatre of activity in which this central paradox of modernism, the connection between the regional and the universal, has been continuously enacted and contested.

Again, there are two main reasons for this. The first is environmental. Australia, with its great deserts, rain forests and wide stretches of open savannah, its curious plants and animals, presented a major challenge to European taste and perception—just as modernism did. Though determined to go on behaving like Europeans in a strange environment, the first settlers were continually challenged by the enduring power of the so-called "primi-

tive" character of the land and the "primitive" character of the people. Though they tried to forget or ignore both, they had to learn to alter their ways. Those who did not accept the challenge created mere imitations, second-order European art.

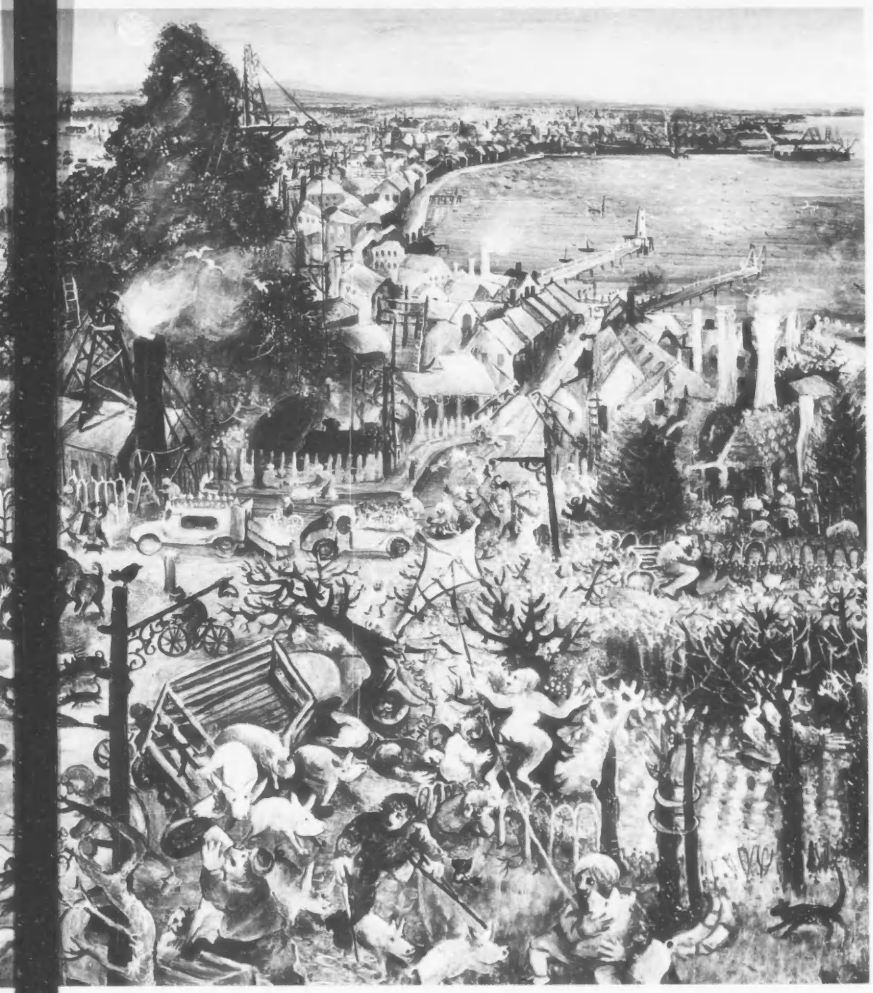
The second reason is cultural. The early European settlers found themselves clinging to the shores of a great continent the size of the United States, situated between the Indian and Pacific Oceans, with south-east Asia to their north. They found themselves surrounded by non-European cultures of great antiquity. This fact has been even more difficult to come to terms with than the natural environment. Nevertheless, under the long-term effects of a radically different environment and surrounding, alien cultures, European conventions in art have been seriously challenged and an excitingly new kind of art is evolving.

Consider architecture. The Aboriginal Australians had no need of permanent buildings. European settlers began building the kinds of houses they had known in their former homelands, but these were found to be unsuitable. The first public building in Australia, Government House in Sydney (1788) was given the form of a Georgian box-like structure—derived ultimately from the fortress-like town house of the Italian Renaissance. But under pressure from the great heat and flooding rains of Australia, the Georgian box transformed itself into a spreading umbrella.

The verandah, pioneered by the Portuguese when creating the first European empire in the tropics, became the active principle in the transformation of Australian colonial architecture. It evolved diverse shapes and structures and was found in all types of building, from rural homesteads to city terraces. By the end of the nineteenth century it had given rise to a style of architecture in Australia as distinctive as the rococo. This style, known as the Federation style because it came to maturity around the time of the federation of the Australian States into the Commonwealth of Australia in 1901, soon spread all over the continent.

The inner dynamic of the Federation style, under the long-term pressure of the environment, was to break up wall spaces, roofs and verandahs into distinctive units. It was an open, relaxed style. This long-term trend persisted, despite the "European" components of modernism, and the most characteristically Australian modernist architecture remained open, light, and free-ranging,

Saddling up at Coen Races **(1953), by Russell Drysdale, one of a brilliant galaxy of Australian artists who emerged during the Second World War.**



The Mining Town, oil and tempera on chipboard panel, by Arthur Boyd (b. 1920)

spreading over the ground and resisting hierarchical disposition of the component parts of the building, or severely ordered groupings. It was an architecture suited to a modern democracy. When that young architect of genius, the Dane Jorn Utzon, made his preliminary designs for the Sydney Opera House, he seems to have intuitively grasped the inner dynamic at work in the evolution of Australian architecture. His great work became a modern masterpiece, a threefold unity of place, form and the transcendent human spirit.

Long-term environmental factors also affected Australian painting, directing it towards an extended, open-form and non-hierarchical style. European-born colonial artists at first tried to apply the styles and aesthetic theories of the picturesque and the sublime that had emerged in response to European landscape over several centuries. But their works looked like false European landscapes. If an artist painting Australian scenery closed off the foreground with side-screens of trees or used belts of vegetation to separate foreground from middle distance and background, a sense of falsity emerged. The picturesque did not work well in Australia.

The first to realize this was the English architect, John Glover. "There is a remarkable peculiarity in the trees of this country," he wrote. "However numerous, they rarely prevent you tracing through them the whole distant country." He had discovered that the Australian landscape possesses a translucency in depth not found in European landscape.

Australian landscape also subverted European notions about the sublime. For Edmund Burke, the essence of the sublime lay in great height and depth*. He did not believe that an extensive plain could be sublime. But when Australian colonial landscape painters such as Conrad Martens exaggerated the heights and depths of the Blue Mountains, near Sydney, they tended to "Europeanize" their depictions. Eugene von Guerard, a fine painter who worked in Australia in the late nineteenth century, became aware of this problem. In his works, sublimity is not achieved by emphasizing and exaggerating height and depth but by endowing the landscape with a feeling of infinite depth and extension in lateral space. A new kind of landscape painting was evolving that subverted conventional notions of the picturesque and the sublime.

As a result Australian landscape painting, like the best Australian architecture, developed as a distinctively open-form structure. It reached its first maturity in the 1890s in the work of the artists of the Heidelberg School, named after the Melbourne suburb where they often gathered to paint. Their work was addressed to the highly distinctive character of Australian light, colour and atmosphere. They produced a brilliantly novel kind of landscape painting which built upon the open-form, "lateral sublime" principles of their colonial predecessors and contained hints of European plein-air and Impressionist painting before the latter became preoccupied with broken colour and the spectrum palette.

The open-form landscape became a powerful tradition in Australia. It survived the reductivist and universalizing

* Burke's contribution to aesthetic theory, *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful,* was published in 1757. *Editor*

***Lady and Unicorn*, charcoal and pastel by Charles Blackman of the "Antipodeans", a group of artists which formed in Melbourne in 1959**

trends of late modernism to be reasserted triumphantly in the landscapes of Fred Williams. He has given contemporary Australians a new vision of their natural environment.

Until the 1960s, the predominantly Anglo-Celtic society of Australia largely ignored the surviving Aboriginal culture it had dispossessed and the cultures which surrounded it in south-east Asia and the Pacific. An important exception to this trend was Margaret Préston who, influenced by the "primitivism" of modernism, turned to Aboriginal art for inspiration and championed it as a source for the establishment of a truly Australian art. She admired and used the dull earth colours of Aboriginal art and its geometric shapes.

Ian Fairweather, an English artist who had lived in China and south-east Asia prior to arriving in Australia in 1934, successfully related his own work to that of both Asian and Aboriginal art. An eccentric genius in the mould of Gauguin—one of the few artists of the twentieth century to produce a creative synthesis of eastern and western art—Fairweather's work deserves to be much better known internationally than it is.

Until the early 1940s, most of the white settlers of the continent had been content to depend upon Britain for protection and to offer nostalgic homage to their European homelands. But when Hitler over-ran western Europe in 1940 and the Japanese bombed Pearl Harbour in 1941, the Australian nation experienced a traumatic shock. For the first time in their history, Australians were forced to consider seriously who they were and where they stood in the world.

That shock gave Australian art renewed vitality. A generation of artists caught up in the tensions of a nation at war began to construct a new kind of Australian art from the humanist components of early modernism. Inspired by surrealism, expressionism and realism, some delved into their personal anxieties and emerged with a new sense of what it was to be Australian. Others began to examine repressed aspects of the Australian psyche, such as its treatment of Aboriginal people. Wartime Australia produced a brilliant galaxy of artists comparable to any grouping then at work anywhere in the world. In mood and presentation their work ranges from the spritely early modernism of Sidney Nolan's paintings in the Wimmera district of Victoria to the brooding compassion of Noel Counihan's paintings of Aboriginal women.

Many of these artists continue to create important work and several possess international reputations, but it was during the 1940s and 1950s that their work made its greatest impact upon Australian culture.

In 1959 a group of seven painters, the Antipodeans—Charles Blackman, Arthur and David Boyd, John Brack, Bob Dickerson, John Perceval and Clifton Pugh—held an exhibition in Melbourne in defiance of the powerful waves of total abstraction then being propagated in Australia, mainly from New York. The event created an uproar that has not yet subsided. What is still not appreciated is that the position the Antipodeans took constituted perhaps the first effective criticism anywhere in the world of the censorious aesthetic limitations of late modernism.

During the 1960s Australian art was colonized by successive waves of American-type abstraction. Art fed upon art almost exclusively. During the past twenty years, a more pluralistic position has been reasserted, the finest achievements of which cannot yet be assessed with any certainty. One hopeful sign is the increased interaction between the European and Aboriginal sources of Australian art and the increasing cultural contacts with Asian and Pacific art. ■

BERNARD SMITH was the Foundation Professor of Contemporary Art and Director of the Power Institute of Fine Arts at the University of Sydney from 1967 to 1977, and was President of the Australian Academy of the Humanities from 1977 to 1980. He is the author of *European Vision and the South Pacific, Australian Painting*, and many other books on Australian art, history and culture.

At the frontiers of science and technology

BY ROBYN WILLIAMS

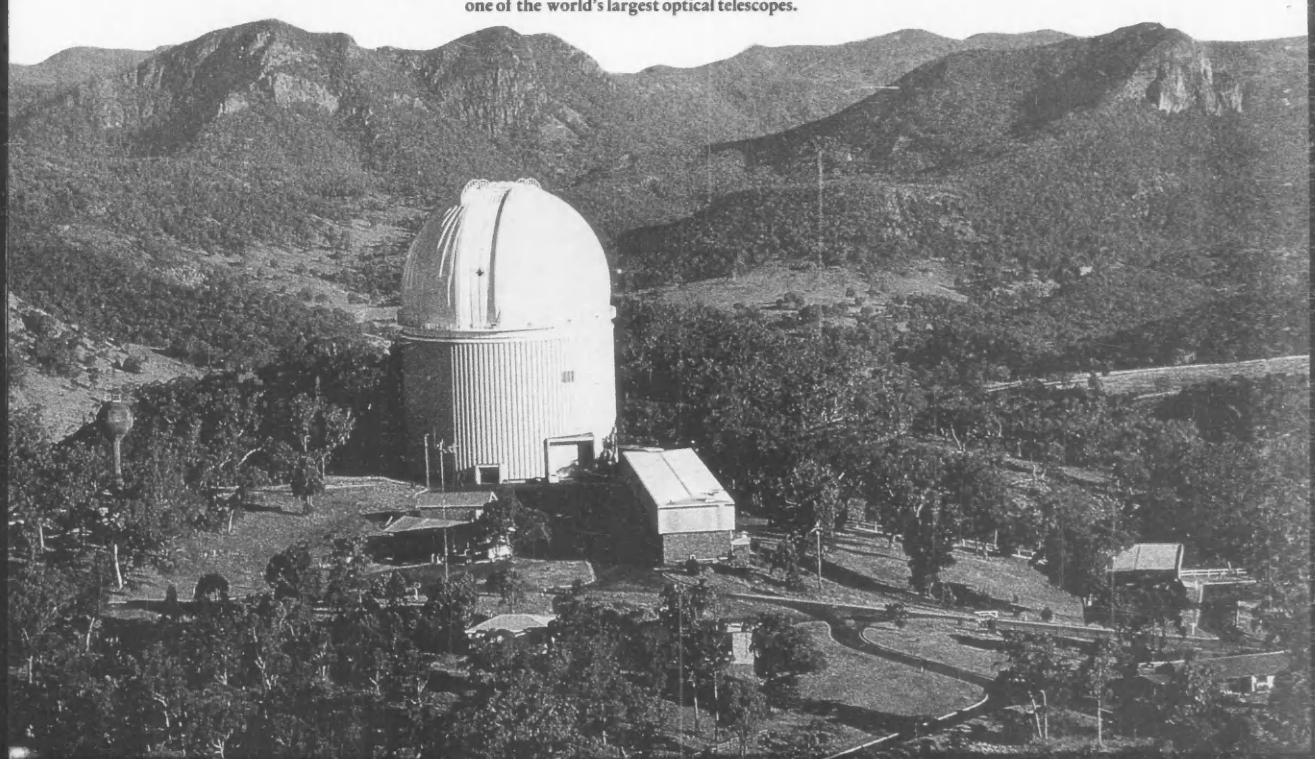
AUSTRALIAN scientific brilliance has been kept secret for far too long. Although they constitute barely 0.3 per cent of the world's population, Australians produce 2 per cent of the world's scientific papers each year. The standard of this work is of the highest order and it is perplexing that this should be so little known, both in Australia and elsewhere. As Dr. Mike Kenward, editor of *New Scientist* magazine, said at the ANZAAS (Australian and New Zealand Association for the Advancement of Science) Centenary Congress in 1988, "both your wine and your scientific achievements are very well kept secrets!"

Among the pioneers of scientific research in Australia, Lawrence Hargrave (1850-1915) was an aeronautical inventor who used kites to develop lighter-than-air flying machines. The first large-scale refrigerators were produced in Australia, enabling ships to carry Australian meat to Europe. Lord Florey (1898-1968) was one of the triumvirate responsible for making penicillin into a usable drug and won a Nobel Prize for his efforts.

Many of these achievements, however, remained either well concealed in ivory towers or firmly linked with establishments overseas. Then, after the Second World War, Australian science experienced an upheaval. One important contribution to this was made by a number of young British scientists who had been engaged in radar research and who came and settled in Australia. They turned the skills they had developed for plucking signals from the sky to astronomy. An explosion in astronomical research followed.

Today Australia has some of the best telescopes on Earth: the optical telescope at the Anglo-Australian Observatory in Coonabarabran, responsible for finding what is perhaps the most distant object in the universe, 10,000 million light years away; and the huge radio dish telescope at Parkes,

The Anglo-Australian Observatory at Siding Spring Mountain, near Coonabarabran, New South Wales, houses one of the world's largest optical telescopes.



which carried to the world the famous signals of American astronaut Neil Armstrong making his first steps on the Moon, and has since discovered several important organic molecules in outer space. In September 1988 the gigantic Australia Telescope was inaugurated in northern New South Wales. With its several dishes on wide railtracks, it is moveable and yet precise to a fraction of a millimetre.

There is also a long tradition of medical research in Australia. The colossus in this field was Sir Macfarlane Burnet, who shared the 1960 Nobel Prize for Physiology or Medicine with Sir Peter Medawar of Britain for their discoveries in immunology. Sir Macfarlane was for many years director of the Walter and Eliza Hall Institute in Melbourne, where today scientists fight cancer and carry out research into tropical diseases, especially malaria.

Next door almost, in the "square mile" of medical institutes around the University of Melbourne, is the Florey Institute where scientists are seeking remedies for high blood pressure and trying to determine the interplay of hormones. One hormone, relaxin, has been isolated and even produced by bacteria using genetic engineering techniques. This hormone is made naturally by the body before childbirth, softening the skeletal parts of the pelvis to allow the baby's head through. Lack of relaxin is a cause of cerebral palsy, so medical provision of the hormone could be of spectacular importance.

Another idea which may have enormous significance is due to Professor Ted Ringwood, a geologist at the Australian National University, who has developed a synthetic rock or glass called Synroc which can be used for the safe disposal of nuclear waste. Synroc has been extensively tested and shown to restrict the passage of radiation. It now remains to be established that this property will last for hundreds of years.

Australia also excels in geological research, especially in the study of desertification and the protection of arid zones. Dry land farming methods are linked to this kind of expertise, which many Australians have taken to Asia and Africa.

AUSTRALIA'S NOBEL LAUREATES IN SCIENCE
Three Australian scientists have been awarded the Nobel Prize for Physiology or Medicine. Left to right:
Howard Walter Florey (Lord Florey; 1898-1968), pathologist. Joint winner, 1945 (with Sir Alexander Fleming and Ernst Boris Chain);
Sir Macfarlane Burnet (1899-1985), physician and virologist. Joint winner, 1960 (with Sir Peter Medawar);
Sir John Carew Eccles (b. 1903), neurophysiologist. Joint winner, 1963 (with Alan Hodgkin and Andrew Huxley).

About 30 per cent of Australia lies in the tropics and, accordingly, great expertise is being acquired in the development of tropical farming methods, new breeds of stock and varieties of grain, and new ways of fighting pests. Perhaps the most pleasing aspect of this, centred on James Cook University in northern Queensland, has been the exchange of ideas with other countries in south-east Asia and the South Pacific.

Perhaps the most spectacular discoveries in Australian science have been in connection with the Australian past. In biology and palaeontology there have been extraordinary finds, including fossils entombed in rock at Riversleigh in northern Queensland which were so extensive that the air force had to be asked to help carry them out. The picture of early Australia they reveal is one of gigantic monsters, of special lines of adaptation, of animals such as marsupial lions and wolves.

Among the recent achievements of Australian technology is a bionic ear developed by Dr. Graham Clarke of Melbourne and now worn by several children who can hear as a result. The

Australian pacemaker (the idea was invented in Australia) commands 40 per cent of the world market. The CSIRO (Commonwealth Scientific and Industrial Research Organization) landing system, the brainchild of Dr. Paul Wild, is in use in airports around the globe. The Repco self-twist spinning machine revolutionized the textile industry after its invention in the 1970s. Sir Alan Walsh invented the atom absorption spectrometer which analyses substances at lightning speed.

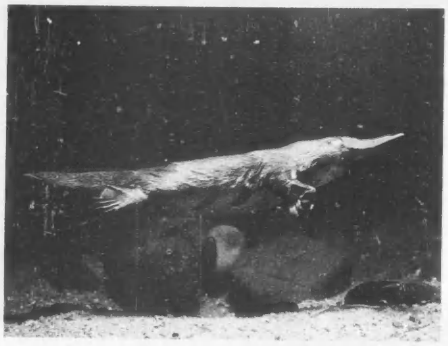
As for the future, a space port is planned for northern Queensland, conveniently placed near the equator for launches. Many Asian space projects are likely to use this facility. The world's largest stellar interferometer (to study stars), being built at the University of Sydney, has been described as one of the most significant developments in astronomy in the past forty years. Remote sensing systems are being used for agriculture, forest protection and mining. The techniques for in vitro fertilization and embryo freezing developed in Melbourne are now being exported to the United States and elsewhere. The computerized switching system for mass communication currently being perfected at the University of Western Australia may soon be adopted as the preferred option in a number of countries.

But many Australians believe that their greatest scientific contributions to the rest of the world are more simple though nonetheless profound. These contributions are sometimes described as "alternative technology", perhaps because they seem less flashy and space-age, perhaps because they adapt traditional technologies. One example is a scheme which uses sand to filter out microscopic bugs to yield clean water. Just that! Yet how many villages in how many nations depend for their existence on the flow of good sweet water? Such a process may not make the headlines but it is the kind of science Australians are getting better at. ■

ROBYN WILLIAMS is Australia's leading science broadcaster. He has been executive producer of the Science Unit of the Australian Broadcasting Corporation since 1972, is Chairman of the Australian Museum Trust, and a member of the Commission for the Future.

Refining plant on Gove Peninsula in the Northern Territory produces alumina from bauxite ore.

'Living fossils'



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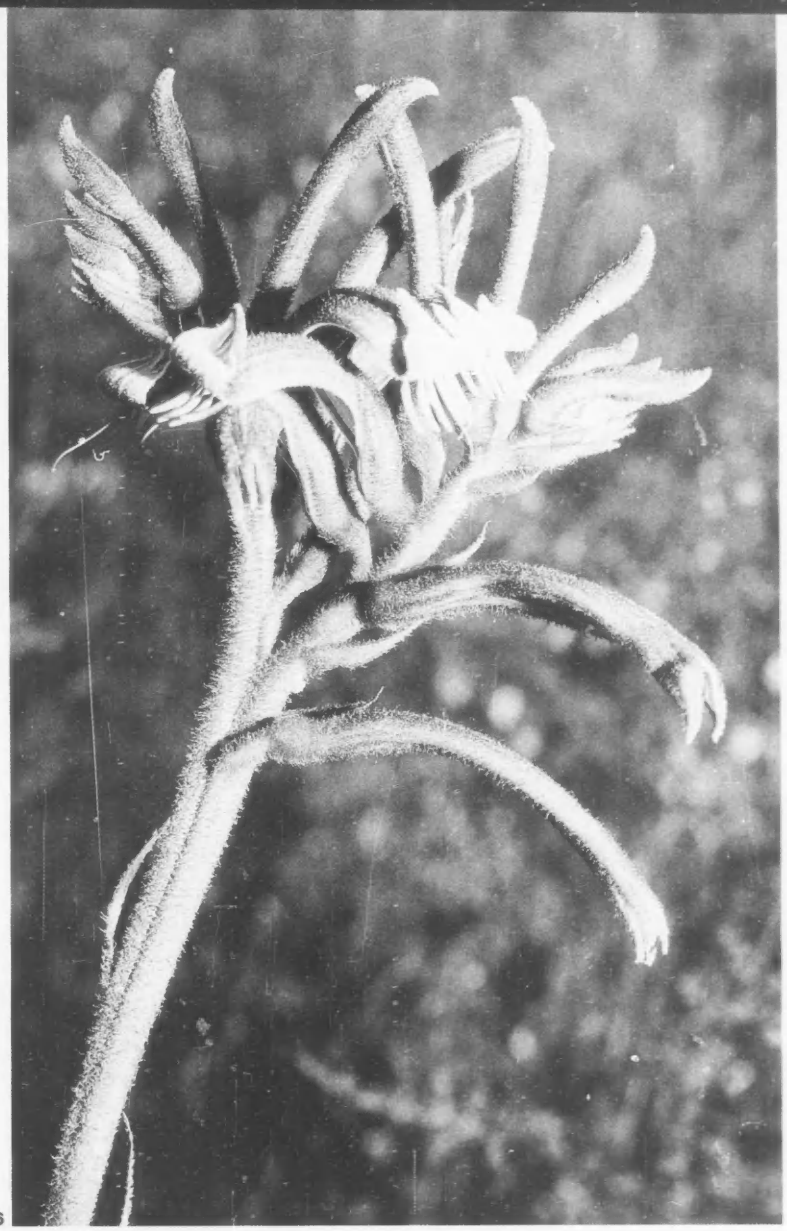
Australia's unique array of unusual plant and animal life features several species of "living fossils" including (1) the platypus (*Ornithorhynchus anatinus*) and (2) the echidna or spiny anteater (*Tachyglossus aculeatus*), both of which possess both reptilian and mammalian characteristics. Marsupials, particularly abundant in Australia, belong to a primitive order of mammals in which gestation of the young is completed after birth, in a pouch on the female's body. Among the Australian marsupials are (3) the pygmy possum (*Burramys parvus*), 14 cm long including its tail, which was thought to be extinct but was recently rediscovered in Victoria; (4) the koala (*Phascolarctos cinereus*), a tree-dwelling animal which resembles a small bear; (5) the kangaroo (*Macropodidae* family). Inset: an emu (*Dromaius novaehollandiae*), a large flightless bird which lives on the plains. (6) The kangaroo-paw plant (*Anigozanthos manglesii*) is the floral emblem of Western Australia. (7) A climbing sundew (*Drosera menziesii*), an insect-eater, uses another plant for support. (8) A "grass tree" belonging to the family *Xanthorrhoeaceae*.



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Long-range learning

Australian education responds to the challenge of distance

BY MALCOLM SKILBECK

AUSTRALIANS have always had to contend with the factor of distance. Early forms of adaptation to remoteness and low population density included the one-teacher school and the itinerant teacher. Residential facilities for students were also provided at an early stage at State high schools in provincial centres and at universities in the capital cities of the States.

Early this century the primary and secondary sectors of the State Education Departments (together with the tertiary sector, led by the Brisbane-based University of Queensland) established correspondence programmes which have since matured into a wide array of organizations providing education at a distance, such as the School of the Air, the Correspondence School, and various distance education networks and departments of external studies.

Despite differences of level, approach and organization, these programmes all subscribe to the principle that structured, formal education in a very wide range of subjects can and should be made available to people regardless of their physical location, their direct access to teachers, libraries and laboratories, their age or stage of educational development.

The conventional view that formal education is contingent on attendance at schools, colleges or universities and presence in classrooms, laboratories and workshops, in face-to-face contact with teachers, is not so much displaced as expanded by the advocates of distance education. All the elements of the conventional approach to teaching and learning are translated into comparable programmes of education at a distance using all the available means of communication.

While distance educators are in theory ready to use whatever means and media seem appropriate, in practice selection is necessary, and it inevitably takes into account practical considerations among which cost and utility rank high. The written word is still the single most important vehicle of distance education at all levels.

The early emergence and success of correspondence education at school and university level depended, of course, upon a comprehensive, reliable postal service. Such a service, now taken for granted, is relatively recent. In a country the size of Australia, the establishment of the postal service was a major public sector achievement of the nineteenth century.

Teachers check a video tape for use with the Kalgoorlie School of the Air, Western Australia.

Left, Black Mountain telecommunications tower on the shores of Lake Burley Griffin, Canberra.

Effective and varied means of communication are of vital importance to the distance education college or university. Although the written word is fundamental, texts can now be produced and transmitted by modern technologies such as word processing, electronic mail and a range of reprographic techniques. Graphics also play an important role in the design and presentation of text, and the use of audio and video tapes, telephone and video tutorials, and satellite broadcasts, is increasing. Tutorial advice and guidance are available to students night and day by telephone, and library delivery services are able to despatch books at twenty-four hours' notice to any point in the country.

The challenge is to integrate all of these elements into a comprehensive teaching-learning system, using low unit-cost technologies, and to make education accessible to any student, anywhere in the country, who can benefit from the opportunities it provides. Recognizing this formidable challenge, the Federal Government, which funds higher education, is now proposing significant changes, including a reduction in the overall number of providers of distance higher education from over forty universities and colleges to six national Distance Education Centres.

While open access is the goal, the number of students participating in distance education programmes is still relatively small. Of a total Australian university and college population of 420,000 in 1988, approximately 48,000 are enrolled in external, distance or off-campus programmes. The trend of enrolments is, however, definitely upward.

The choice of subjects offered by distance education in Australia is already considerable, yet there is need for even greater variety. Growth during the past decade has resulted in a disproportionate provision of programmes and courses in the arts, humanities and social sciences. This is not surprising, nor is it cause for regret. Institutions have responded to student demand and have satisfied many interests in so doing. Furthermore, courses in these disciplines have been easier to develop than in those requiring more laboratory, workshop or fieldwork provision.

The British Open University pioneered the philosophy of the second chance in higher education. Australian institutions have followed suit and will continue to explore this theme, for example in relation to groups that have been under-represented in higher education: lower socio-economic groups, Aborginals, and women (now, however, in some subjects more strongly represented than men). But access to distance education is increasingly associated with trained professionals, who need to upgrade or change their skills.

Important as is the emphasis on the needs of the professions and the continuing commitment to the principle of the "second chance", perhaps the greatest challenge to higher distance education lies in the continuing development, appraisal and renewal of basic educational philosophies and strategies. As the target groups change to embrace an ageing, more highly educated, professionally sophisticated and consumption-conscious population, education policies and approaches must be adapted accordingly. ■

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Using the 2-way radio, these youngsters receive daily lessons and assignments, ask and answer questions, and listen to other pupils.

The Australian cinema

From *The Kelly Gang* to *Crocodile Dundee*

BY KIM WILLIAMS

Poster from the Australian National Film and Sound Archive, which has a collection of around 29,000 films, a quarter of a million film stills, 30,000 posters and 3,000 scripts.

THE early decades of the twentieth century saw a flourishing period of feature film production in Australia. Film-makers had begun making documentaries of daily life, combined film and slide shows, and background films for stage plays as early as 1896. The highlight of this period was *The Story of the Kelly Gang* (1906), believed to be the first feature-length film made in the world.

During the "Silent Era" (c. 1907-1928) well over 150 Australian feature films were produced, but by 1929 a combination of forces—the introduction of sound films from overseas, an increasing stranglehold on the local market by American and British distributors and the devastation of the Depression—signalled a downturn in Australian film production from which it would take decades to recover.

The transition to sound in the early 1930s was costly and difficult, though a few directors adapted to the new technology and made commercially successful films dealing with Australian subjects, often located in the bush.

During the Second World War, feature film output dropped as film-makers were involved in newsreels and documentaries. While production was down, however, cinema attendances reached an all-time peak in 1944-1945, with 151 million admissions per year.

The post-war period brought an influx of British and American film companies attracted to Australia by its exotic locations. Few indigenous films were produced. (A notable exception was Charles Chauvel's *Jedda* of 1953, the first Australian colour feature film which dealt with relations between Aboriginals and whites.)

By the late 1960s and early 1970s, a period marked by social change, political protest and cultural re-examination, there was a burgeoning underground film culture, based primarily in Melbourne and Sydney. This period of questioning and change created an environment conducive to lobbying the government to stimulate a national film industry and provide the necessary financial support. The government accepted the cultural arguments and, with its assistance, a "renaissance" began.

The first films to emerge, such as Tim Burstall's *Stork* and *Alvin Purple* and Bruce Beresford's *The Adventures of Barry McKenzie*, explored a strand of Australian humour. They were all financially successful in Australia and overseas. There was a familiarity about the uncultivated characters portrayed which endeared these films to audiences, but some people found the rawness embarrassing and sought for a more refined and sophisticated view of Australia to be reflected in its cinema.

Films such as *Sunday Too Far Away* and *Picnic at Hanging Rock* satisfied this need for quality cinema rooted in the Australian experience and/or the literary tradition. A combination of Australian landscape, good production standards and a certain narrative simplicity became the symbols of the Australian cinema, capturing the imagination of international audiences and generating national pride.

Funding for short drama, documentaries and experimental works also made it possible for new directors to explore ideas and techniques and to acquire film-making skills. Many of these films were adventurous and inventive.

Still from an Australian TV series, *All the Rivers Run*, the story of a girl riverboat skipper in the late 19th century.

Some of today's well-known Australian directors, such as Peter Weir and Gillian Armstrong, made documentaries and short dramas during this period.

Documentary film-making attracted attention in the late 1970s as film-makers expanded their subject matter and dealt with such themes as Asian and Latin American politics, communism, the environment and Aboriginal society.

Partly as a result of escalating costs and a desire to consolidate the economic base for film production, in June 1981 the Federal Government introduced a tax incentive scheme to attract more private investment to feature films, documentaries, telemovies and television mini-series.

The films produced in the first few years of the tax incentive scheme included work by some of Australia's best-known film-makers such as Bruce Beresford *(Puberty Blues)*, Gillian Armstrong *(Starstruck)*, George Miller *(Mad Max)* and Peter Weir *(The Year of Living Dangerously)*. Some of them, including *Breaker Morant, Mad Max 2* (also known as *The Road Warrior*), *Gallipoli, The Man from Snowy River, Puberty Blues, Careful, He Might Hear You* and *Phar Lap*, were popular and commercially successful.

Around this time film-makers were also becoming interested in television mini-series. The national and international success of *A Town Like Alice* in 1980 stimulated demand and, in the next two years, ten mini-series were produced. Historical subjects predominated, ranging from the penal colonies *(For the Term of His Natural Life, Sara Dane* and *Under Capricorn)*, bush-ranging *(The Last Outlaw)*, the pioneer spirit *(All the Rivers Run)*, the rise of nationalism *(Eureka Stockade)*, Aboriginals *(Women of the Sun)*, to industrial unrest in the 1920s *(Waterfront)*. Three mini-series were on contemporary themes—*Return to Eden*, a dramatic love story; *Silent Reach*, about big business in Queensland; and *The Dismissal*, about the demise of the Whitlam government.

Despite the generous tax incentives,

Pillow-fight scene in *My Brilliant Career* (1979), by Gillian Armstrong. The film, set at the turn of the century, tells the story of a farmer's daughter (played by Judy Davis, below) who spends much of her time writing and dreaming of the future.

Paul Hogan in the title role of *Crocodile Dundee* (1986)

however, it became evident in 1983 that, after a boost of activity, the Australian film industry was facing some serious problems, and substantial cost increases were undermining the economics of film production.

The Australian Government, responsive to these problems and concerned with the influx of speculative promoters and the overall quality of production, introduced a package which, on the one hand, reduced the tax concessions and, on the other, allocated a special fund of $5 million to encourage the production of high quality film and television with commercial potential. The fund was to be administered by the government's statutory film authority, the Australian Film Commission, which had been established in 1975.

The industry was changing as heavy reliance on direct government investment was being replaced by private investment. Producers were obliged to guarantee investors some revenue and, in order to do that, they had to sell distribution rights before the film or television project was made. To attract the sort of backing required, they had to look to distribution in the United States and Europe. With such a dependence on the international market, there was an inherent tension between the objectives of developing an Australian cinema and the needs of distributors.

Many producers responded to the challenge of how to make films which are Australian in spirit but have an international appeal. Audiences have responded to such films as *Crocodile Dundee* (1986), which is the most successful film ever released in Australia, the largest grossing foreign film released in the United States, and which broke the all-time box office record in the United Kingdom.

In addition, television mini-series such as *Return to Eden, The Anzacs, Fields of Fire* and *The Last Frontier* enjoyed success in the United States, the United Kingdom and Europe. The two-part *Fields of Fire* came fifth and sixth in the National Top 10 ratings in the United Kingdom, *The Last Frontier* topped the mini-series ratings in the United States with an estimated audience of 65 million viewers, and *All the Rivers Run* was seen by 75 million viewers in the Soviet Union.

In November 1985 a co-production programme was introduced to assist Australian producers in collaborating with foreign partners on approved coventures and still receive the benefits of the tax incentive scheme. Arrangements are now in place with the Centre National de la Cinématographie (France), the British Broadcasting Corporation and Channel Four (United Kingdom), the New Zealand Film Commission and the Corporation for Public Broadcasting (United States), and are currently being negotiated with Canada and Italy.

By mid-1985 it had again become clear that the tax incentive scheme was pushing producers to obtain extremely high pre-sales, that the costs of attracting investment were rising significantly and that there was uncertainty about the level of finance available as the marginal tax rate dropped. The industry's financial base was shaky.

The Australian Film Commission then proposed the creation of an independent Australian Film Finance Corporation to replace the film tax concessions. The corporation would operate like a bank, securing its loans against the rights in the programme, or against sales agreements. On 1 July 1988, the Federal Government established the Film Finance Corporation with first-year funding of $70 million. There is now a new financial climate for film production in Australia, and while there is some uncertainty as to how the new system will operate, there is renewed optimism and energy in the film and television industry. ■

KIM WILLIAMS was until recently Chief Executive of the Australian Film Commission. A member of the arts and entertainment committee of the Australian Bicentennial Authority, he is a former Director of the Confederation of Australian Professional Performing Arts.

THE LAND AND THE PEOPLE

Facts and figures

AUSTRALIA is the only nation to occupy an entire continent.

With a **surface area** of 7,682,300km², it is nearly as large as the United States excluding Alaska and Hawaii and almost twice the combined areas of India and Pakistan. The **coastline** measures 36,735km.

It is the **flattest** continent. The average elevation is less than 300m, compared with the world's mean of about 700m. Only about 5 % of the continent is more than 600m above sea level. The highest peak is Mount Kosciusko (2,228m).

It is also the world's driest inhabited continent and vast areas are arid or semi-desert, unsuitable for settlement. As a result it is **sparsely populated,** with an average of 2 persons per km².

Australia is one of the most **urbanized** nations: most of its 16 million people live in cities and towns on the coastal fringes.

The **climate** ranges from tropical in the north to temperate in the south. Summer is from December to February, autumn from March to May, winter from June to August, and spring from September to November.

Immigration has played an important role in Australia's development since the earliest days of European settlement. In the 4 decades since World War II, 4.2 million people from more than 120 countries have settled there. Today, relative to population size, the immigration intake (a projected 140,000 new arrivals for 1988) is larger than that of any other country. In 1986 one in every five Australians (3.4 million) was born overseas.

By origin the population comprises the following elements:

- Aborigines and Torres Strait Islanders (approx. 1 % of total population);
- People from United Kingdom and Ireland backgrounds of 3 or more generations ago (approx. 60 %);
- People from non-English-speaking backgrounds of 3 or more generations ago (approx. 5 %);
- First and second generation Australians from an English-speaking background (approx. 14 %);
- Second generation Australians from a non-English-speaking background (approx. 8 %);
- First generation Australians from a non-English-speaking background (approx. 12 %)

Some 15 % (1.7 million people) of Australia's population aged 15 and over have a language other than English as their first language. Major groups of non-English-speakers and their numbers are as follows: Italian: 440,776; Greek: 227,167; German: 165,633; Dutch: 110,540; Polish: 86,016; Chinese: 85,000; Arabic: 77,565; Croatian: 65,882; Maltese: 60,000; Spanish: 56,500; Serbian: 27,000; Vietnamese: 27,252*. None of the 150 Aboriginal languages still spoken has more than 3,000 speakers.

Comparison of trends between the censuses of 1976 and 1986 reveals that there has been a significant increase in the number of speakers of Chinese, Arabic, Macedonian, Vietnamese, Filipino languages, Spanish, Maltese, Portuguese and Polish.

During 1987 the Australian Government adopted a national policy on languages which has as a major goal the encouragement of widespread bilingualism.

* Language Survey conducted by the Australian Bureau of Statistics, May 1983.

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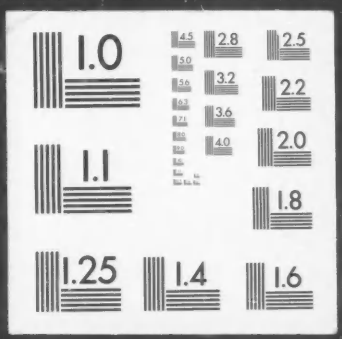
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